1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

Synonym(s) 37260228 - PRODUCT CODE • LITHIUM METAL BATTERIES • LITHIUM SULPHUR DIOXIDE PRIMARY UNIT CELLS AND MULTI CELL BATTERY SYSTEMS COMPOSED OF THESE CELLS. • NSN: 6130-66-123-8091

1.2 Uses and uses advised against

Use(s) AVIATION APPLICATIONS • BATTERIES

1.3 Details of the supplier of the safety data sheet

Supplier name **DEFENCE CAPABILITY ACQUISITION AND SUSTAINMENT GROUP**

Address Brindabella Park, ACT, Australia, 2600

Telephone 02 6266 7054 (0800 - 1700 Mon-Fri)

Fax 02 6266 7646

Email casg.occhyg@defence.gov.au

Website Not supplied

1.4 Emergency telephone number(s)

Emergency 13 11 26 (24 hours)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

2.2 Label elements

No signal word, pictograms, hazard or precautionary statements have been allocated.

2.3 Other Hazards

The Li-SO2 batteries described in this Battery Information Sheet are sealed units which are n ot hazardous under normaloperating conditions in accordance with manufacturer's recommendations, as stated in the user's manual or other similar documentation. Under normal use, the battery integrity is maintained and the active components it contains are isolated from the outside.
In particular, the battery should not be submitted to any mechanical (opening, puncture, immersion), thermal (burning, heating to temperatures above the normal temperature range of the product) or electrical abuse (short-circuit, recharge, forced discharge), which will lead to the activation of safety valves and/or the rupture of the battery container.
Any accidental release of the inner components of the cell, or their combustion products could be highly hazardous. Battery content exposition to air humidity/liquid water may be followed by severe battery vent/explosion/fire, depending on the hazard causes and circumstances.

Protection from charging:
Whenever lithium batteries are not the single power source in a circuit, the following measures recommended by Underwriters Laboratories are relevant. The cells should not be connected in series with an electrical power source that would increase the load through the cells. The electronic circuit shall include one of the following:
A. Two suitable diodes or the equivalent in series with the cells to prevent any reverse (charging) current. The second diode is used to provide protection in the event that one would fail. Quality control, or equivalent procedures, shall be established by the device manufacturer to check that the diode polarity is correct for each unit; or
B. A blocking diode or the equivalent to prevent any reverse (charging) current and a resistor to limit current in case of diode failure. The resistor should be sized to limit the reverse (cha rging) current to the maximum value according to the data sheet of the cell.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS number	EC number	Content
SULPHUR DIOXIDE	7446-09-5	231-195-2	<30%
ACETONITRILE	75-05-8	200-835-2	<9%

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

Ingredient	CAS number	EC number	Content
CARBON BLACK	1333-86-4	215-609-9	6.5 - 7.5%
LITHIUM	7439-93-2	231-102-5	<3%
LITHIUM BROMIDE	7550-35-8	231-439-8	2 - 2.5%
NON HAZARDOUS INGREDIENTS	Not Available	Not Available	remainder

Ingredient notes Each unit cell consists of a hermetically sealed metallic can containing a number of chemicals and materials of construction of which the following are potentially hazardous upon release to air.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye Exposure is considered unlikely unless casing is damaged. Flush gently with running water. Seek medical attention if irritation develops.

Inhalation Exposure is considered unlikely. Due to product form / nature of use, an inhalation hazard is not anticipated.

Skin Exposure is considered unlikely unless casing is damaged. Gently flush affected areas with water. Seek medical attention if irritation develops.

Ingestion For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting. Ingestion is considered unlikely due to product form.

First aid facilities Eye wash facilities should be available.

4.2 Most important symptoms and effects, both acute and delayed

Adverse effects not expected from this product. Exposure to battery contents may cause irritation and potential burns.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Dry agent. Do NOT use water. Prevent contamination of drains and waterways.

5.2 Special hazards arising from the substance or mixture

Contents react with water. May explode if exposed to high temperatures due to pressure build up in battery casing. Lithium may burn in a fire situation and may be ejected from the battery. Damaged cells may evolve toxic and flammable vapours.

5.3 Advice for firefighters

Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

4W

4	Dry Agent (water MUST NOT be allowed to come into contact with substance).
W	Risk of violent reaction or explosion. Wear liquid-tight chemical protective clothing and breathing apparatus. Contain spill and run-off.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

If spilt, collect and reuse where possible. If battery is broken or damaged, absorb liquid with sand or similar. Contain spillage, then collect and place in suitable containers for disposal. CAUTION: Avoid exposure to contents.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas. IMPORTANT NOTICE: Lithium-Sulfur dioxide batteries are not rechargeable and should not be charged or recharged. Manufacturer's recommendations should be followed regarding maximum current and operating temperature range. Applying pressure or deforming the battery may lead to disassembly and cause eye, skin and throat irritation.

* Do not open the battery system.
* Do not crush or pierce the cells.
* Do not short (+) or (-) terminal with conductors.
* Do not reverse the polarity.
* Do not submit to excessive mechanical stress.
* Do not mix batteries of different types or mix new and old ones together.
* Do not use the unit without its electronic management system.
* Do not expose the unit to water or condensation.
* Do not directly heat, solder or throw into fire. Such unsuitable use can cause leakage or spout vapourised electrolyte fumes and may cause fire or explosion.

7.2 Conditions for safe storage, including any incompatibilities

Store tightly sealed in a cool, dry, well ventilated area, removed from water, incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Store below 85°C.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Substance	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Acetonitrile	SWA (AUS)	40	67	60	101
Carbon black	SWA (AUS)	--	3	--	--
Sulphur dioxide	SWA (AUS)	2	5.2	5	13

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering Controls Avoid inhalation. Use in well ventilated areas. Maintain vapour levels below the recommended exposure standard.

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

PPE

Eye/Face	No PPE specified.
Hand	Wear PVC or rubber gloves.
Body	No PPE specified.
Respiratory	No PPE specified.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	CYLINDRICAL BATTERY CASE
Odour	ODOURLESS (PUNGENT ODOUR IF LEAKING)
Odour Threshold	NOT AVAILABLE
pH	NOT AVAILABLE
Melting Point	NOT AVAILABLE
Boiling Point	NOT AVAILABLE
Flash Point	NOT RELEVANT
Evaporation Rate	NOT AVAILABLE
Flammability	NON FLAMMABLE
Upper Explosion Limit	NOT RELEVANT
Lower Explosion Limit	NOT RELEVANT
Vapour Pressure	NOT AVAILABLE
Vapour Density	NOT AVAILABLE
Solubility (water)	NOT AVAILABLE
Partition Coefficient	NOT AVAILABLE
Autoignition Temperature	NOT AVAILABLE
Decomposition Temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive Properties	NOT AVAILABLE
Oxidising Properties	NOT AVAILABLE
Specific Gravity	> 1

9.2 Other information

No information provided.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Heat above 70°C or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Recharge. Short circuit. Expose over a long period to humid conditions.

10.5 Incompatible materials

Battery contents are incompatible with water (evolving flammable gas), oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), heat and ignition sources.

10.6 Hazardous decomposition products

May evolve hydrogen and lithium oxides when heated to decomposition.

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Health Hazard Summary

No information provided.

No information provided.

No information provided.

No information provided.

No information provided.

SULPHUR DIOXIDE (7446-09-5)
- LC50 (Inhalation): 2520 ppm/1 hour (rat)
- LCLo (Inhalation): 1000 ppm/10 minutes (human)
- TCLo (Inhalation): 3 ppm/5 days (human)

ACETONITRILE (75-05-8)
- LC50 (Inhalation): 3587 ppm/4 hrs (mice)
- LD50 (Ingestion): 617 mg/kg (mice)
- LD50 (Skin): > 2000 mg/kg (rabbit)
- LDLo (Subcutaneous): 105 mg/kg (rabbit)
- TCLo (Inhalation): 160 ppm/4 hrs (man)
- TDLo (Ingestion): 64 mg/kg (man)

CARBON BLACK (1333-86-4)
- LD50 (Ingestion): > 8000 mg/kg (rat)

LITHIUM (7439-93-2)
- LD50 (Intraperitoneal): 1 g/kg (mouse)

LITHIUM BROMIDE (7550-35-8)
- LD50 (Ingestion): 1800 mg/kg (rat)
- LD50 (Intraperitoneal): 580 mg/m³ (guinea pig)
- LD50 (Subcutaneous): 1680 mg/kg (mouse)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

This product may be hazardous to the environment.

12.2 Persistence and degradability

This product is not readily biodegradable.

12.3 Bioaccumulative potential

Limited information was available at the time of this review.

12.4 Mobility in soil

This product has low mobility in soil.

12.5 Results of PBT and vPvB assessment

No information provided.

12.6 Other adverse effects

No information provided.

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal Reuse or recycle where possible. Return to manufacturer/supplier. Contact your state EPA or the manufacturer for additional information.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1 UN number	3090	3090	3090
14.2 UN proper shipping name	LITHIUM METAL BATTERIES (including lithium alloy batteries)		
14.3 Transport hazard classes			
DG Class	9	9	9
Subsidiary risk(s)	None Allocated	-	-
14.4 Packing group	II	II	II
14.5 Environmental hazards		None Allocated	
14.6 Special precautions for user			
Hazchem Code	4W		
EMS		F-A, S-I	

Other information 3090 - LITHIUM METAL BATTERIES: Shipment of cells and batteries in bulk.
3091 - LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT: Cells and batteries contained in equipment or packed with it.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications None allocated

Risk phrases None allocated

Safety phrases None allocated

Inventory listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

15.2 Chemical safety assessment

No information provided.

16. OTHER INFORMATION

Additional information This 'Defence Converted' Safety Data Sheet (SDS) was prepared based on the information from the original 'Manufacturer's' SDS. Defence Converted SDSs are for Defence use or undertakings only. Defence is not a distributor or retail supplier of this product.
Original Supplier:

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

Saft Ltd.
River Drive, Tyne & Wear, SOUTH SHIELDS, NE33 2TR
United Kingdom
Phone: +1 44 191 456 1451

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

WORKPLACE CONTROLS AND PRACTICES: Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report Status This ChemAlert report has been independently compiled by RMT's scientific department utilising the original Safety Data Sheet ('SDS') for the product provided to RMT by the manufacturer. The information is based on

Product name **PRIMARY LI-SO2 SINGLE CELLS AND MULTI-CELL BATTERY PACKS**

the latest chemical and toxicological research and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. It is an independent collation by RMT of information obtained from the original SDS for this product. Its content has not been authorised or verified by the manufacturer / distributor of the chemical to which it relates.

This ChemAlert report does not constitute the manufacturer's original SDS and is not intended to be a replacement for same. It is provided to subscribers of ChemAlert as a reference tool only, is not all-inclusive and does not represent any guarantee as to the properties of the product. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this ChemAlert report, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this ChemAlert report.

Prepared By

Risk Management Technologies
5 Ventnor Ave, West Perth
Western Australia 6005
Phone: +61 8 9322 1711
Fax: +61 8 9322 1794
Email: info@rmt.com.au
Web: www.rmt.com.au

Last Reviewed: 02 May 2016
Date Printed: 10 Oct 2016
Based on SDS dated: 02 May 2016

End of Report